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(54) **SIDELINK TRANSMISSION METHOD AND DEVICE**

(57) Disclosed in embodiments of the present disclosure are a sidelink transmission method and device. The method is executed by a terminal device and comprises : performing configuration according to first configuration information such that the terminal device simultaneously works in network device scheduling mode Mode 1 and terminal device autonomous mode Mode 2.

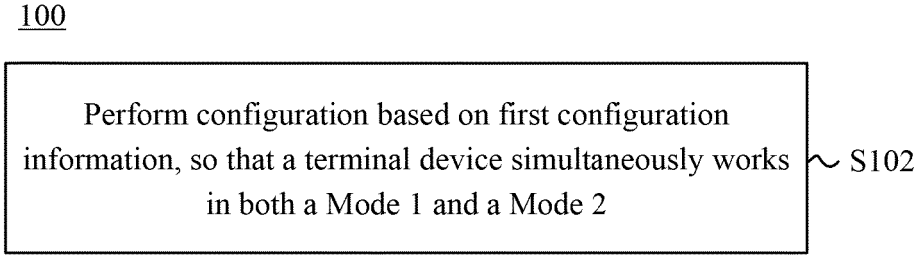

FIG. 1

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Description

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims priority to Chinese Patent Application No. 201910064816.3, filed on January 23, 2019 in China, which is incorporated herein by reference in its entirety.

TECHNICAL FIELD

[0002] Embodiments of the present disclosure relate to the communications field, and in particular, to a sidelink (SideLink, SL for short, or translated into a side link, a lateral link, or an edge link) transmission method and device.

BACKGROUND

[0003] A Long Term Evolution (Long Term Evolution, LTE) system supports SL transmission, that is, data transmission can be directly performed between terminal devices over a wireless air interface. In the LTE system, a terminal device works in only one resource allocation mode. In a new radio (New Radio, NR) system, because more diversified QoS services need to be supported, the foregoing resource allocation mode probably cannot meet a data transmission QoS requirement.

SUMMARY

[0004] Embodiments of the present disclosure provide an SL transmission method and a device, to resolve a problem that it is difficult to meet a data transmission QoS requirement in a single resource allocation mode.

[0005] According to a first aspect, an SL transmission method is provided. The method is performed by a terminal device, and the method includes: performing configuration based on first configuration information, so that the terminal device simultaneously works in both a network device scheduling mode Mode 1 and a terminal device autonomous mode Mode 2.

[0006] According to a second aspect, an SL transmission method is provided. The method is performed by a network device, the method includes: sending first configuration information, where the first configuration information is used to instruct a terminal device to configure a resource allocation mode, and the resource allocation mode includes a Mode 1 and a Mode 2.

[0007] According to a third aspect, a terminal device is provided. The terminal device includes a configuration module, configured to perform configuration based on first configuration information, so that the terminal device simultaneously works in both a Mode 1 and a Mode 2.

[0008] According to a fourth aspect, a network device is provided. The network device includes a sending module, configured to send first configuration information, where the first configuration information is used to instruct a terminal device to configure a resource allocation mode, and the resource allocation mode includes a Mode 1 and a Mode 2.

[0009] According to a fifth aspect, a terminal device is provided. The terminal device includes a processor, a memory, and a program that is stored in the memory and executable on the processor, where when the processor executes the program, the steps of the SL transmission method in the first aspect are implemented.

[0010] According to a sixth aspect, a network device is provided. The network device includes a processor, a memory, and a program that is stored in the memory and executable on the processor, where when the processor executes the program, the steps of the SL transmission method in the second aspect are implemented.

[0011] According to a seventh aspect, a computer-readable storage medium is provided. The computer-readable storage medium stores a computer program, and when a processor executes the computer program, the steps of the SL transmission methods in the first aspect and the second aspect are implemented.

[0012] In some embodiments of the present disclosure, the terminal device may perform related configuration based on configuration information, so that the terminal device can work in both the Mode 1 and the Mode 2 during SL transmission. The terminal device has diversified resource allocation modes, so that resource utilization efficiency of SL transmission can be improved, and different QoS requirements can be met.

BRIEF DESCRIPTION OF DRAWINGS

[0013] The accompanying drawings illustrated herein are provided to further understand this application and form a part of this application. The exemplary embodiments of this application and the descriptions thereof are used to explain this application and do not constitute an improper limitation on this application. In the accompanying drawings:

FIG. 1 is a schematic flowchart of an SL transmission method according to an embodiment of the present disclosure;

FIG. 2 is a schematic scenario diagram of an SL transmission method according to an embodiment of the present disclosure;

FIG. 3 is a schematic MAC diagram of an SL transmission method according to an embodiment of the present disclosure;

FIG. 4 is a schematic MAC diagram of an SL transmission method according to another embodiment of the present disclosure;

FIG. 5 is a schematic flowchart of an SL transmission method according to another embodiment of the present disclosure;

FIG. 6 is a schematic structural diagram of a terminal device according to an embodiment of the present disclosure;

FIG. 7 is a schematic structural diagram of a network device according to an embodiment of the present disclosure;

FIG. 8 is a schematic structural diagram of a terminal device according to another embodiment of the present disclosure; and

FIG. 9 is a schematic structural diagram of a network device according to another embodiment of the present disclosure.

DETAILED DESCRIPTION OF EMBODIMENTS

[0014] To make the objectives, technical solutions, and advantages of this application clearer, the following clearly and completely describes the technical solutions of this application with reference to the specific embodiments of this application and the corresponding accompanying drawings Apparently, the described embodiments are merely some rather than all of the embodiments of this application. All other embodiments obtained by a person of ordinary skill in the art based on the embodiments of this application without creative efforts shall fall within the protection scope of this application.

[0015] It should be understood that the technical solutions in the embodiments of the present disclosure may be applied to various communications systems, such as Global System for Mobile Communications (Global System of Mobile communication, GSM), a Code Division Multiple Access (Code Division Multiple Access, CDMA) system, a Wideband Code Division Multiple Access (Wideband Code Division Multiple Access, WCDMA) system, a general packet radio service (General Packet Radio Service, GPRS) system, a Long Term Evolution (Long Term Evolution, LTE) system, an LTE frequency division duplex (Frequency Division Duplex, FDD) system, an LTE time division duplex (Time Division Duplex, TDD) system, a universal mobile telecommunications system (Universal Mobile Telecommunication System, UMTS) or a worldwide interoperability for microwave access (Worldwide Interoperability for Microwave Access, WiMAX) communications system, a 5G system, a new radio (New Radio, NR) system, or a subsequent evolved communications system.

[0016] In some embodiments of the present disclosure, a terminal device may include but is not limited to a mobile station (Mobile Station, MS), a mobile terminal (Mobile Terminal), a mobile telephone (Mobile Telephone), user equipment (User Equipment, UE), a handset (handset), portable equipment (portable equipment), a vehicle (vehicle), and the like. The terminal device may communicate with one or more core networks by using a radio access network (Radio Access Network, RAN). For example, the terminal device may be a mobile telephone (or referred to as a "cellular" telephone), or a computer having a wireless communication function; or the terminal device may be a portable, pocket-sized, handheld, computer built-in, or in-vehicle mobile apparatus.

[0017] In some embodiments of the present disclosure, a network device is an apparatus that is deployed in a radio access network and that is used to provide a wireless communication function for a terminal device. The network device may be a base station, and the base station may include various forms such as a macro base station, a micro base station, a relay station, or an access point. In systems that use different radio access technologies, devices that have a base station function may have different names. For example, in an LTE network, the network device is referred to as an evolved NodeB (Evolved NodeB, eNB or eNodeB), and in a 3rd Generation (3rd Generation, 3G) network, the network device is referred to as a NodeB (NodeB) or a network device in the subsequent evolved communications system. However, the terms do not constitute a limitation.

[0018] As shown in FIG. 1, an embodiment of the present disclosure provides an SL transmission method 100. The method may be performed by a terminal device, and includes the following steps.

[0019] S102: Perform configuration based on first configuration information, so that the terminal device simultaneously works in both a Mode 1 and a Mode 2.

[0020] Optionally, the foregoing first configuration information may be obtained in at least one of the following three manners:

being preconfigured;

being sent through a network device broadcast message; and

being sent through dedicated radio resource control RRC signaling of network device.

[0021] If the foregoing first configuration information is sent through the network device broadcast message or the dedicated RRC signaling of network device, before step S102, the terminal device may further receive the first configuration information.

[0022] The Mode 1 mentioned in the embodiments of the present disclosure is a network device scheduling mode. For the Mode 1, the terminal device may obtain a sidelink control channel (Physical Sidelink Control Channel, PSCCH) resource pool configuration and an associated sidelink shared channel (Physical Sidelink Shared Channel, PSSCH) resource pool configuration of the Mode 1 by receiving system broadcast signaling and the like sent by the network device. When the terminal device has to-be-transmitted data, the terminal device requests a dedicated Mode 1 communication resource from the network device through a buffer status report (Buffer Status Report, BSR).

[0023] The Mode 2 mentioned in the embodiments of the present disclosure is a terminal device autonomous mode. For the Mode 2, the terminal device obtains a PSCCH resource pool configuration and an associated PSSCH resource pool configuration of the Mode 2 by receiving network device system broadcast signaling, or obtains a PSCCH resource pool configuration and an associated PSSCH resource pool configuration of the

Mode 2 through the dedicated RRC signaling of network device, or determines a PSCCH resource pool configuration and an associated PSSCH resource pool configuration of the Mode 2 through preconfiguration information. In each PSCCH period, the terminal device randomly selects sending resources of a PSCCH and an associated PSSCH.

[0024] According to the SL transmission method provided in some embodiments of the present disclosure, the terminal device may perform related configuration based on configuration information, so that the terminal device can work in both the Mode 1 and the Mode 2 during SL transmission. The terminal device has diversified resource allocation modes, so that resource utilization efficiency of SL transmission can be improved, and different QoS requirements can be met.

[0025] For the foregoing improving resource utilization efficiency of SL transmission, in the related art, the terminal device supports only one single resource allocation mode, and cannot fully use communications resources. Especially, in an SL communication scenario, when a large amount of service data or service data of many types needs to be transmitted, the foregoing disadvantage is more obvious.

[0026] According to the SL transmission method provided in some embodiments of the present disclosure, after performing configuration based on configuration information, the terminal device can work in both the Mode 1 and the Mode 2, to make full use of SL resources. In addition, a correspondence between a service and the Mode 1 or the Mode 2 may be determined based on a quality of service QoS or a service type of the service, to meet different QoS requirements.

[0027] The first configuration information may be used to instruct the terminal device to perform related configuration of working in the Mode 1 and the Mode 2. Optionally, based on the foregoing embodiment, the first configuration information may include at least one of the following five types:

(1) Mapping relationship between an SL logical channel identifier used in SL transmission and an SL logical channel group identifier: Generally, there is a mapping relationship between one SL logical channel group identifier and a plurality of SL logical channel identifiers.

(2) Mapping relationship between a mode type and an SL logical channel identifier:

The mode type herein includes at least one of the Mode 1 and the Mode 2. Specifically, the mapping relationship between a mode type and an SL logical channel identifier may be the following three cases: a mapping relationship between the Mode 1 and an SL logical channel identifier; or a mapping relationship between the Mode 2 and an SL logical channel identifier; or a mapping relationship between the Mode 1 and an SL logical channel identifier and a mapping relationship between the Mode 2 and an SL logical channel identifier.

(3) Mapping relationship between a mode type and an SL logical channel group identifier: The mode type herein includes at least one of the Mode 1 and the Mode 2. Specifically, the mapping relationship between a mode type and an SL logical channel group identifier may be the following three cases: a mapping relationship between the Mode 1 and an SL logical channel group identifier; or a mapping relationship between the Mode 2 and an SL logical channel group identifier; or a mapping relationship between the Mode 1 and an SL logical channel group identifier and a mapping relationship between the Mode 2 and an SL logical channel group identifier.

[0028] In the implementation of (2) or (3), in a case that the terminal device simultaneously works in both the Mode 1 and the Mode 2, a logical channel or a logical channel group corresponding to the Mode 1 may further be distinguished from a logical channel or a logical channel group corresponding to the Mode 2.

[0029] (4) Mapping relationship between a mode type and a sidelink radio bearer identifier (SideLink Radio Bearer Identity, SLRB ID): The mode type herein includes at least one of the Mode 1 and the Mode 2. Specifically, the mapping relationship between a mode type and an SLRB ID may be the following three cases: a mapping relationship between the Mode 1 and an SLRB ID; or a mapping relationship between the Mode 2 and an SLRB ID; or a mapping relationship between the Mode 1 and an SLRB ID and a mapping relationship between the Mode 2 and an SLRB ID.

[0030] In this implementation, the mapping relationship between a mode type and an SLRB ID is established. In a case that the terminal device simultaneously works in both the Mode 1 and the Mode 2, a correspondence between a service and the Mode 1 or the Mode 2 may be determined based on at least one of a quality of service QoS and a service type of the service, that is, different types of service data can be sent in different resource allocation modes (that is, the Mode 1 or the Mode 2) in this implementation.

[0031] (5) Mapping relationship between a mode type and a destination identifier (Destination ID): The mode type herein includes at least one of the Mode 1 and the Mode 2. Specifically, the mapping relationship between a mode type and a destination ID may be the following three cases: a mapping relationship between the Mode 1 and a destination ID; or a mapping relationship between the Mode 2 and a destination ID; or a mapping relationship between the Mode 1 and a destination ID and a mapping relationship between the Mode 2 and a destination ID.

[0032] In this implementation, the mapping relationship between a mode type and a destination ID is established, and a correspondence between a service and the Mode 1 or the Mode 2 may be determined based on at least one of a quality of service QoS and a service type

of the service, that is, different types of service data can be sent in different resource allocation modes (that is, the Mode 1 or the Mode 2) in this implementation.

[0033] Based on the foregoing plurality of embodiments, in a case that the terminal device simultaneously works in both the Mode 1 and the Mode 2:

Optionally, as shown in FIG. 2 and FIG. 3, for terminal devices (UE1 and UE2) that perform SL communication, the Mode 1 and the Mode 2 may share a Media Access Control MAC entity.

[0034] Further, optionally, as shown in FIG. 2 and FIG. 4, for terminal devices (UE1 and UE2) that perform SL communication, the Mode 1 and the Mode 2 may correspond to different MAC entities.

[0035] In the embodiments shown in FIG. 2 to FIG. 4, the first configuration information may further include a mapping relationship between a mode type and an SLRB ID.

[0036] The following separately describes two cases in which the Mode 1 and the Mode 2 share a MAC entity, and the Mode 1 and the Mode 2 correspond to different MAC entities.

[0037] In the embodiments shown in FIG. 2 and FIG. 3, terminal devices (for example, UE1 and UE2) that perform SL communication may separately create a MAC entity, and when both a mode 1 and a mode 2 of the UE1 and the UE2 work, one MAC entity is shared. That is, in FIG. 3, when both the mode 1 and the mode 2 of the UE1 work, a MAC1 is shared, and when both the mode 1 and the mode 2 of the UE2 work, a MAC2 is shared.

[0038] The foregoing is merely described by using SL communication between the UE1 and the UE2 as an example. As shown in FIG. 2, for SL communication between the UE1 and UE3, SL communication between the UE1 and UE4, and the like, the content described in each corresponding embodiment of the present disclosure is also applicable, and is not described again herein.

[0039] In a case that the Mode 1 and the Mode 2 share a MAC entity, the performing configuration based on first configuration information in step S102 in the foregoing several embodiments may further include: defining that the MAC entity shared by the Mode 1 and the Mode 2 performs at least one of the following behaviors:

> (1) If there is no buffer data in currently configured SL logical channels (which may be all SL logical channels), a sidelink buffer status report SL BSR is triggered in a case that an SL logical channel on which data arrives (which may be one or more of the currently configured SL logical channels) corresponds to the Mode 1.

[0040] In this implementation, the first configuration information may include a mapping relationship between a mode type and an SL logical channel identifier.

[0041] (2) If there is buffer data in at least one of currently configured SL logical channels (which may be all SL logical channels), an SL BSR is triggered in a case that an SL logical channel on which data arrives (which may be one or more of the currently configured SL logical channels) has a higher logical channel priority and the SL logical channel on which data arrives corresponds to the Mode 1.

[0042] In this implementation, the first configuration information may include a mapping relationship between a mode type and an SL logical channel identifier.

[0043] "An SL logical channel on which data arrives has a higher logical channel priority" mentioned in this implementation means that a priority of an SL logical channel on which data arrives currently is higher than a priority of an SL logical channel in which there is buffer data in the currently configured SL logical channels.

[0044] (3) If a retransmission SL BSR timer expires, an SL BSR is triggered in a case that there is buffer data in at least one of currently configured SL logical channels (which may be all SL logical channels), and an SL logical channel corresponding to the retransmission SL BSR timer corresponds to the Mode 1.

[0045] In this implementation, the first configuration information may include a mapping relationship between a mode type and an SL logical channel identifier.

[0046] In the foregoing plurality of implementations, when an SL BSR trigger condition is met, an SL BSR can be triggered in a timely manner, to request, from the network device in a timely manner, resources required for transmission in the Mode 1, thereby improving communication efficiency.

[0047] In addition, an SL BSR is triggered only in a case that buffer data arrives on a logical channel corresponding to the Mode 1, and the SL BSR is not triggered in a case that buffer data arrives on a logical channel corresponding to the Mode 2.

[0048] Optionally, in a case that the Mode 1 and the Mode 2 share a MAC entity, the performing configuration based on first configuration information in step S102 in the foregoing several embodiments may further include: defining that the MAC entity shared by the Mode 1 and the Mode 2 performs the following behavior:

> ignoring buffer data in a target SL logical channel when a buffer size indicated by a BS field of an SL BSR is being calculated, where
> the target SL logical channel includes at least one of the following: an SL logical channel corresponding to the Mode 2 and an SL logical channel corresponding to a destination identifier corresponding to the Mode 2.

[0049] In the foregoing implementation, buffer data in an SL logical channel corresponding to the Mode 2 can be ignored, and only buffer data in an SL logical channel corresponding to the Mode 1 is calculated into the SL BSR, so that the Mode 1 and the Mode 2 can independently work without affecting each other.

[0050] In a case that the Mode 1 and the Mode 2 share a MAC entity, optionally, the terminal device may further

perform flexible switching between resource allocation modes. Specifically, the terminal device may perform configuration based on second configuration information, so that the terminal device works only in the Mode 1 or the Mode 2, that is, cancels working in both the Mode 1 and the Mode 2.

[0051] The second configuration information may be obtained in at least one of the following manners:

being preconfigured;
being sent through a network device broadcast message; and
being sent through dedicated radio resource control RRC signaling of network device.

[0052] Optionally, the performing configuration based on second configuration information may include: defining that the MAC entity shared by the Mode 1 and the Mode 2 performs at least one of the following behaviors:

(1) cancelling a triggered SL BSR;
(2) cancelling a triggered scheduling request SR, where the SR is triggered through an SL BSR;
(3) stopping or restarting a retransmission SL BSR timer; and
(4) stopping or restarting a periodic SL BSR timer.

[0053] In the foregoing plurality of implementations, after the terminal device switches from working in both the Mode 1 and the Mode 2 to working in the Mode 1 or the Mode 2, and especially enters the Mode 2, the terminal device may cancel or stop a previous related configuration in a timely manner, and further may perform reconfiguration when working in the Mode 1 or the Mode 2, to avoid configuration impact caused by resource allocation mode switching, thereby improving communication effectiveness.

[0054] As shown in FIG. 2 and FIG. 4, for terminal devices (UE1 and UE2) that perform SL communication, the Mode 1 and the Mode 2 may correspond to different MAC entities. In this embodiment, a pair of terminal devices (UE1 and UE2) that perform SL communication may separately create a pair of MAC entities. Referring to FIG. 4, a mode 1 of the UE1 works at a MAC 11, and a mode 2 works at a MAC 12; and a mode 1 of the UE2 works at a MAC 21, and a mode 2 works at a MAC 22.

[0055] In a case that the Mode 1 and the Mode 2 correspond to different MAC entities, the performing configuration based on first configuration information in step S102 in the foregoing several embodiments may further include: obtaining, based on the first configuration information, maximum transmit power P_max; maximum transmit power P_max1 of a MAC entity corresponding to the Mode 1; and maximum transmit power P_max2 of a MAC entity corresponding to the Mode 2.

[0056] In this way, the performing configuration based on first configuration information in step S102 in the foregoing several embodiments may further include: if the P_max is greater than a sum of the P_max1 and the P_max2, defining that the MAC entity corresponding to the Mode 1 and the MAC entity corresponding to Mode 2 perform one of the following four behaviors.

(1) Remaining power is allocated to the MAC entity corresponding to the Mode 1, or remaining power is allocated to the MAC entity corresponding to the Mode 2.

[0057] The remaining power herein may be obtained by using a difference between the P_max and the P_max1 and a difference between the P_max and the P_max2.

[0058] (2) Remaining power is allocated to the MAC entity corresponding to the Mode 1 and the MAC entity corresponding to the Mode 2 based on a first preset proportion.

[0059] In this implementation, the first preset proportion may be prestored. Specifically, for example, the first preset proportion may be 5:5 or 6:4.

[0060] (3) Remaining power is allocated to the MAC entity corresponding to the Mode 1 or the MAC entity corresponding to the Mode 2 based on a size relationship between a priority of to-be-transmitted data and a first preset threshold.

[0061] Specifically, for example, if the priority of the to-be-transmitted data is greater than or equal to the first preset threshold, the remaining power is allocated to the MAC entity corresponding to the Mode 1. If the priority of the to-be-transmitted data is less than the first preset threshold, the remaining power is allocated to the MAC entity corresponding to the Mode 2.

[0062] In this implementation, optionally, the to-be-transmitted data may be transmitted by using the MAC entity to which the remaining power is allocated.

[0063] (4) Remaining power is allocated to the MAC entity corresponding to the Mode 1 or the MAC entity corresponding to the Mode 2 based on a size relationship between a priority P_1 of to-be-transmitted data corresponding to the Mode 1 and a priority P_2 of to-be-transmitted data corresponding to the Mode 2.

[0064] Specifically, for example, if P_1 is greater than or equal to P_2, the remaining power is allocated to the MAC entity corresponding to the mode 1. If P_1 is less than P_2, the remaining power is allocated to the MAC entity corresponding to the mode 2.

[0065] Optionally, if the P_max is less than a sum of the P_max 1 and the P_max2, it is defined that a MAC entity corresponding to the Mode 1 and a MAC entity corresponding to the Mode 2 perform one of the following four behaviors:

(1) The P_max1 or the P_max2 is reduced based on a difference between the P_max and the P_max1 and a difference between the P_max and the P_max2.

[0066] Optionally, the P_max1 or the P_max2 may be further reduced based on a value P obtained by subtracting the P_max from the sum of the P_max 1 and the P_max2.

[0067] The power value reduced for the P_max1 or the P_max2 may be equal to the foregoing obtained value P, or may be greater than the foregoing obtained value P.

[0068] (2) The P_max1 and the P_max2 are reduced based on a second preset proportion.

[0069] In this implementation, the second preset proportion may be prestored. Specifically, for example, the second preset proportion may be 5:5 or 4:6.

[0070] The total power value reduced for the P_max1 or the P_max2 may be equal to the foregoing obtained value P, or may be greater than the foregoing obtained value P.

[0071] (3) The P_max1 or the P_max2 is reduced based on a size relationship between a priority of to-be-transmitted data and a second preset threshold.

[0072] Specifically, for example, if the priority of the to-be-transmitted data is greater than or equal to the second preset threshold, the P_max2 is reduced; or if the priority of the to-be-transmitted data is less than the second preset threshold, the P_max1 is reduced.

[0073] The power value reduced for the P_max1 or the P_max2 may be equal to the foregoing obtained value P, or may be greater than the foregoing obtained value P.

[0074] In this implementation, the to-be-transmitted data may be specifically transmitted by using a MAC entity for which power is not reduced.

[0075] (4) The P_max1 or the P_max2 is reduced based on a size relationship between a priority P_3 of to-be-transmitted data corresponding to the Mode 1 and a priority P_4 of to-be-transmitted data corresponding to the Mode 2.

[0076] Specifically, for example, if P_3 is greater than or equal to P_4, the P_max2 is reduced; or if P_3 is less than P_4, the P_max1 is reduced.

[0077] The power value reduced for the P_max1 or the P_max2 may be equal to the foregoing obtained value P, or may be greater than the foregoing obtained value P.

[0078] For the foregoing several embodiments, optionally, the performing configuration based on first configuration information in step S102 may include: if a first resource corresponding to the Mode 1 conflicts with a second resource corresponding to the Mode 2, selecting a resource according to at least one of the following rules:

(1) The first resource or the second resource is preferentially used.

(2) It is determined, based on a size relationship between a priority of to-be-transmitted data and a third preset threshold, to use the first resource or the second resource.

[0079] Specifically, for example, if the priority of the to-be-transmitted data is greater than or equal to the third preset threshold, the first resource is used; or if the priority of the to-be-transmitted data is less than the third preset threshold, the second resource is used.

[0080] In this implementation, the to-be-transmitted data may be specifically transmitted by using a resource selected after a resource conflict occurs.

[0081] (3) It is determined, based on a size relationship between a priority P_5 of to-be-transmitted data corresponding to the Mode 1 and a priority P_6 of to-be-transmitted data corresponding to the Mode 2, to use the first resource or the second resource.

[0082] Specifically, for example, if P_5 is greater than or equal to P_6, the first resource is used; or if P_5 is less than P_6, the second resource is used.

[0083] For the foregoing several embodiments, optionally, the performing configuration based on first configuration information in step S102 may further include: defining that the terminal device performs at least one of the following behaviors:

(1) sending sidelink control information SCI, where the SCI is used to indicate that SL scheduling is based on the Mode 1 or the Mode 2; and

(2) sending sidelink feedback control information SFCI, where the SFCI is used to indicate that SL hybrid automatic repeat request HARQ is based on the Mode 1 or the Mode 2.

[0084] The SL transmission method according to some embodiments of the present disclosure is described above in detail with reference to FIG. 1 to FIG. 4. An SL transmission method according to another embodiment of the present disclosure is described in detail below with reference to FIG. 5. It may be understood that interaction between a network device and a terminal device described on the network device side is the same as that described on the terminal device side in the method shown in FIG. 1. To avoid repetition, related descriptions are appropriately omitted.

[0085] FIG. 5 is a schematic flowchart of implementing an SL transmission method according to some embodiments of the present disclosure, and the method may be applied to a network device side. As shown in FIG. 5, the method 500 includes the following step.

[0086] S502: Send first configuration information, where the first configuration information is used to instruct a terminal device to configure a resource allocation mode, and the resource allocation mode includes a Mode 1 and a Mode 2.

[0087] According to the SL transmission method provided in some embodiments of the present disclosure, the terminal device may perform related configuration based on configuration information, so that the terminal device can work in both the Mode 1 and the Mode 2 during SL transmission. The terminal device has diversified resource allocation modes, so that resource utilization efficiency of SL transmission can be improved, and different QoS requirements can be met.

[0088] The SL transmission method according to some

embodiments of the present disclosure is described above in detail with reference to FIG. 1 to FIG. 5. A terminal device according to some embodiments of the present disclosure is described in detail below with reference to FIG. 6.

[0089] FIG. 6 is a schematic structural diagram of a terminal device according to some embodiments of the present disclosure. As shown in FIG. 6, a terminal device 600 includes:

a configuration module 602, configured to perform configuration based on first configuration information, so that the terminal device simultaneously works in both a Mode 1 and a Mode 2.

[0090] In some embodiments of the present disclosure, the terminal device may perform related configuration based on configuration information, so that the terminal device can work in both the Mode 1 and the Mode 2 during SL transmission. The terminal device has diversified resource allocation modes, so that resource utilization efficiency of SL transmission can be improved, and different QoS requirements can be met.

[0091] Optionally, in an embodiment, the first configuration information includes at least one of the following:

a mapping relationship between an SL logical channel identifier and an SL logical channel group identifier;
a mapping relationship between a mode type and an SL logical channel identifier;
a mapping relationship between a mode type and an SL logical channel group identifier;
a mapping relationship between a mode type and an SL radio bearer identifier; and
a mapping relationship between a mode type and a destination identifier, where the mode type includes the Mode 1 and/or the Mode 2.

[0092] Optionally, in an embodiment,

the Mode 1 and the Mode 2 share a MAC entity; or the Mode 1 and the Mode 2 correspond to different MAC entities.

[0093] Optionally, in an embodiment, the Mode 1 and the Mode 2 share a MAC entity, and the configuration module 602 may be specifically configured to:
define that the MAC entity performs at least one of the following behaviors:

if there is no buffer data in currently configured SL logical channels, triggering a sidelink buffer status report SL BSR in a case that an SL logical channel on which data arrives corresponds to the Mode 1;
if there is buffer data in at least one of currently configured SL logical channels, triggering an SL BSR in a case that an SL logical channel on which data arrives has a higher logical channel priority and the SL logical channel on which data arrives corresponds to the Mode 1; and
if a retransmission SL BSR timer expires, triggering an SL BSR in a case that there is buffer data in at least one of currently configured SL logical channels, and an SL logical channel corresponding to the retransmission SL BSR timer corresponds to the Mode 1.

[0094] Optionally, in an embodiment, the Mode 1 and the Mode 2 share a MAC entity, and the configuration module 602 may be specifically configured to:
define that the shared MAC entity performs the following behavior:

ignoring buffer data in a target SL logical channel when a buffer size indicated by a BS field of an SL BSR is being calculated, where
the target SL logical channel includes at least one of the following: an SL logical channel corresponding to the Mode 2 and an SL logical channel corresponding to a destination identifier corresponding to the Mode 2.

[0095] Optionally, in an embodiment, the configuration module 602 may be further configured to:
perform configuration based on second configuration information, so that the terminal device works in the Mode 1 or the Mode 2.

[0096] Optionally, in an embodiment, the Mode 1 and the Mode 2 share a MAC entity, and the configuration module 602 may be specifically configured to:
define that the MAC entity performs at least one of the following behaviors:

cancelling a triggered SL BSR;
cancelling a triggered scheduling request SR, where the SR is triggered through an SLBSR;
stopping or restarting a retransmission SL BSR timer; and
stopping or restarting a periodic SL BSR timer.

[0097] Optionally, in an embodiment, the Mode 1 and the Mode 2 correspond to different MAC entities, and the configuration module 602 may be configured to:

obtain, based on the first configuration information, maximum transmit power P_max of the terminal device;
maximum transmit power P_max1 of a MAC entity corresponding to the Mode 1; and
maximum transmit power P_max2 of a MAC entity corresponding to the Mode 2.

[0098] Optionally, in an embodiment, the Mode 1 and the Mode 2 correspond to different MAC entities, and the configuration module 602 may be configured to:
if the P_max is greater than a sum of the P_max1 and the P_max2, define that a MAC entity corresponding to

the Mode 1 and a MAC entity corresponding to the Mode 2 perform one of the following four behaviors:

allocating remaining power to the MAC entity corresponding to the Mode 1, or allocating remaining power to the MAC entity corresponding to the Mode 2; or
allocating remaining power to the MAC entity corresponding to the Mode 1 and the MAC entity corresponding to the Mode 2 based on a first preset proportion; or
allocating remaining power to the MAC entity corresponding to the Mode 1 or the MAC entity corresponding to the Mode 2 based on a size relationship between a priority of to-be-transmitted data and a first preset threshold; or
allocating remaining power to the MAC entity corresponding to the Mode 1 or the MAC entity corresponding to the Mode 2 based on a size relationship between a priority of to-be-transmitted data corresponding to the Mode 1 and a priority of to-be-transmitted data corresponding to the Mode 2.

[0099] Optionally, in an embodiment, the Mode 1 and the Mode 2 correspond to different MAC entities, and the configuration module 602 may be configured to: if the P_max is less than a sum of the P_max 1 and the P_max2, define that a MAC entity corresponding to the Mode 1 and a MAC entity corresponding to the Mode 2 perform one of the following four behaviors:

reducing the P_max1 or the P_max2 based on a difference between the P_max and the P_max1 and a difference between the P_max and the P_max2; or reducing the P_max1 and the P_max2 based on a second preset proportion; or
reducing the P_max1 or the P_max2 based on a size relationship between a priority of to-be-transmitted data and a second preset threshold; or
reducing the P_max1 or the P_max2 based on a size relationship between a priority of to-be-transmitted data corresponding to the Mode 1 and a priority of to-be-transmitted data corresponding to the Mode 2.

[0100] Optionally, in an embodiment, the configuration module 602 may be specifically configured to:
if a first resource corresponding to the Mode 1 conflicts with a second resource corresponding to the Mode 2, select a resource according to at least one of the following rules:

preferentially using the first resource or preferentially using the second resource;
determining, based on a size relationship between a priority of to-be-transmitted data and a third preset threshold, to use the first resource or the second resource; and
determining, based on a size relationship between a priority of to-be-transmitted data corresponding to the Mode 1 and a priority of to-be-transmitted data corresponding to the Mode 2, to use the first resource or the second resource.

[0101] Optionally, in an embodiment, the configuration module 602 may be specifically configured to:
define that the terminal device 600 performs at least one of the following:

sending sidelink control information SCI, where the SCI is used to indicate that SL scheduling is based on the Mode 1 or the Mode 2; and
sending sidelink feedback control information SFCI, where the SFCI is used to indicate that SL HARQ is based on the Mode 1 or the Mode 2.

[0102] Optionally, in an embodiment, the first configuration information is obtained in at least one of the following manners:

being preconfigured;
being sent through a network device broadcast message; and
being sent through dedicated RRC signaling of network device.

[0103] For the terminal device 600 according to some embodiments of the present disclosure, reference may be made to the corresponding procedure of the method 100 according to some embodiments of the present disclosure, and the units/modules in the terminal device 600 and the foregoing operations and/or functions are respectively for implementing the corresponding procedures of the method 100. For brevity, details are not described herein again.

[0104] FIG. 7 is a schematic structural diagram of a network device according to some embodiments of the present disclosure. As shown in FIG. 7, a network device 700 includes:
a sending module 702, configured to send first configuration information, where the first configuration information is used to instruct a terminal device to configure a resource allocation mode, and the resource allocation mode includes a Mode 1 and a Mode 2.

[0105] In some embodiments of the present disclosure, the terminal device may perform related configuration based on configuration information, so that the terminal device can work in both the Mode 1 and the Mode 2 during SL transmission. The terminal device has diversified resource allocation modes, so that resource utilization efficiency of SL transmission can be improved, and different QoS requirements can be met.

[0106] The network device 700 according to some embodiments of the present disclosure may be corresponding to the procedure of the method 500 in some embodiments of the present disclosure, and the units/modules in the network device 700 and the foregoing operations and/or functions are respectively for implementing the

corresponding procedures of the method 500. For brevity, details are not described herein again.

[0107] FIG. 8 is a block diagram of a terminal device according to another embodiment of the present disclosure. As shown in FIG. 8, a terminal device 800 includes: at least one processor 801, a memory 802, at least one network interface 804, and a user interface 803. All components of the terminal device 800 are coupled together by using the bus system 805. It can be understood that the bus system 805 is configured to implement connection and communication between these components. In addition to a data bus, the bus system 805 may include a power bus, a control bus, and a status signal bus. However, for clear description, various buses are marked as the bus system 805 in FIG. 8.

[0108] The user interface 803 may include a display, a keyboard, or a clicking device (for example, a mouse, a trackball (trackball)), a touch panel, or a touchscreen.

[0109] It may be understood that the memory 802 in some embodiments of the present disclosure may be a volatile memory or a nonvolatile memory, or may include both a volatile memory and a nonvolatile memory. The nonvolatile memory may be a read-only memory (Read-Only Memory, ROM), a programmable read-only memory (Programmable ROM, PROM), an erasable programmable read-only memory (Erasable PROM, EPROM), an electrically erasable programmable read-only memory (Electrically EPROM, EEPROM), or a flash memory. The volatile memory may be a random access memory (RAM), used as an external cache. Through example but not limitative description, many forms of RAMs may be used, for example, a static random access memory (Static RAM, SRAM), a dynamic random access memory (Dynamic RAM, DRAM), a synchronous dynamic random access memory (Synchronous DRAM, SDRAM), a double data rate synchronous dynamic random access memory (Double Data Rate SDRAM, DDRSDRAM), an enhanced synchronous dynamic random access memory (Enhanced SDRAM, ESDRAM), a synchlink dynamic random access memory (Synchlink DRAM, SLDRAM), and a direct rambus random access memory (Direct Rambus RAM, DRRAM). The memory 802 in the system and the method described in some embodiments of the present disclosure is intended to include, but is not limited to, these memories and memories of any other proper type.

[0110] In some implementations, the memory 802 stores the following element: an executable module or a data structure, a subset thereof, or an extended set thereof: an operating system 8021 and an application 8022.

[0111] The operating system 8021 includes various system programs, such as a framework layer, a core library layer, and a driver layer, and is configured to implement various basic services and process hardware-based tasks. The application 8022 includes various applications, for example, a media player (Media Player) and a browser (Browser), and is configured to implement various application services. A program for implementing the method in some embodiments of the present disclosure may be included in the application 8022.

[0112] In some embodiments of the present disclosure, the terminal device 800 further includes a program that is stored in the memory 802 and executable on the processor 801, and when the processor 801 executes the program, the following steps of the method 100 are implemented.

[0113] The methods disclosed in some embodiments of the present disclosure may be applied to the processor 801 or implemented by the processor 801. The processor 801 may be an integrated circuit chip having a signal processing capability. During implementation, each step of the foregoing method may be completed by using an integrated logic circuit of hardware in the processor 801 or an instruction in a form of software. The foregoing processor 801 may be a general-purpose processor, a digital signal processor (Digital Signal Processor, DSP), an application specific integrated circuit (Application Specific Integrated Circuit, ASIC), a field programmable gate array (Field Programmable Gate Array, FPGA) or another programmable logic component, a discrete gate or a transistor logic component, or a discrete hardware component. The processor 801 may implement or execute the methods, steps, and logic block diagrams disclosed in some embodiments of the present disclosure. The general-purpose processor may be a microprocessor or may be any conventional processor or the like. The steps of the method disclosed in some embodiments of the present disclosure may be directly performed by a hardware decoding processor or by a combination of hardware and software modules in the decoding processor. The software module may be located in a mature computer-readable storage medium in this field such as a random access memory, a flash memory, a read-only memory, a programmable read-only memory or an electrically erasable programmable memory, or a register. The computer-readable storage medium is located in the memory 802, and the processor 801 reads information in the memory 802 and completes the steps in the foregoing method in combination with hardware of the processor 801. Specifically, the computer-readable storage medium stores a computer program, and when the computer program is executed by the processor 801, the steps of the foregoing embodiment of method 100 are performed.

[0114] It can be understood that those embodiments described in some embodiments of the present disclosure can be implemented with hardware, software, firmware, middleware, microcode, or a combination thereof. For hardware implementation, a processing unit may be implemented in one or more application specific integrated circuits (Application Specific Integrated Circuits, ASIC), digital signal processors (Digital Signal Processing, DSP), digital signal processing devices (DSP Device, DSPD), programmable logic devices (Programmable Logic Device, PLD), field-programmable gate arrays (Field-Programmable Gate Array, FPGA),

general purpose processors, controllers, microcontrollers, microprocessors, or other electronic units or a combination thereof used to perform the functions in this application.

[0115] For implementation with software, the technology described in some embodiments of the present disclosure may be implemented by executing functional modules (for example, a process and a function) described in some embodiments of the present disclosure. Software codes can be stored in the memory and executed by the processor. The memory may be implemented in the processor or outside the processor.

[0116] The terminal device 800 can implement each process implemented by the terminal device in the foregoing embodiments. To avoid repetition, details are not described herein again.

[0117] Referring to FIG. 9, FIG. 9 is a structural diagram of a network device applied to some embodiments of the present disclosure, and the network device can implement details of the method embodiment 500 and achieve a same effect. As shown in FIG. 9, a network device 900 includes a processor 901, a transceiver 902, a memory 903, and a bus interface.

[0118] In some embodiments of the present disclosure, the network device 900 further includes a program that is stored in the memory 903 and executable on the processor 901, and when the processor 901 executes the program, the steps of the method 500 are implemented.

[0119] In FIG. 9, a bus architecture may include any quantity of interconnected buses and bridges. Specifically, various circuits of one or more processors represented by the processor 901 and a memory represented by the memory 903 are interconnected. The bus architecture may further link various other circuits such as a peripheral device, a voltage regulator, and a power management circuit. These are well known in the art, and therefore are not further described in this specification. The bus interface provides an interface. The transceiver 902 may be a plurality of components. To be specific, the transceiver 902 includes a transmitter and a receiver, and provides a unit configured to communicate with various other apparatuses on a transmission medium.

[0120] The processor 901 is responsible for managing the bus architecture and common processing, and the memory 903 may store data used when the processor 901 performs an operation.

[0121] Some embodiments of the present disclosure further provide a computer-readable storage medium. The computer-readable storage medium stores a computer program, and when a processor executes the computer program, the processes of the method embodiment 100 and the method embodiment 500 are implemented and a same technical effect can be achieved. To avoid repetition, details are not described herein again. The computer-readable storage medium is, for example, a read-only memory (Read-Only Memory, ROM for short), a random access memory (Random Access Memory, RAM for short), a magnetic disk, or an optical disc.

[0122] It should be noted that, in this specification, the terms "include", "comprise", or their any other variant is intended to cover a non-exclusive inclusion, so that a process, a method, an article, or an apparatus that includes a list of elements not only includes those elements but also includes other elements which are not expressly listed, or further includes elements inherent to such process, method, article, or apparatus. An element limited by "includes a ..." does not, without more constraints, preclude the presence of additional identical elements in the process, method, article, or apparatus that includes the element.

[0123] Based on the descriptions of the foregoing implementations, a person skilled in the art may clearly understand that the method in the foregoing embodiment may be implemented by software in addition to a necessary universal hardware platform or by hardware only. In most circumstances, the former is a preferred implementation. Based on such an understanding, the technical solutions of the present disclosure essentially or the part contributing to the prior art may be implemented in a form of a software product. The computer software product is stored in a storage medium (such as a ROM/RAM, a magnetic disk, or an optical disc), and includes several instructions for instructing a terminal (which may be a mobile phone, a computer, a server, an air conditioner, a network device, or the like) to perform the methods described in the embodiments of the present disclosure.

[0124] The embodiments of the present disclosure are described above with reference to the accompanying drawings, but the present disclosure is not limited to the foregoing specific implementations. The foregoing specific implementations are merely exemplary instead of restrictive. Under enlightenment of the present disclosure, a person of ordinary skills in the art may make many forms without departing from the aims of the present disclosure and the protection scope of claims, all of which fall within the protection of the present disclosure.

Claims

1. A sidelink SL transmission method, performed by a terminal device and comprising:
   performing configuration based on first configuration information, so that the terminal device simultaneously works in both a network device scheduling mode Mode 1 and a terminal device autonomous mode Mode 2.

2. The method according to claim 1, wherein the first configuration information comprises at least one of:

   a mapping relationship between an SL logical channel identifier and an SL logical channel group identifier;
   a mapping relationship between a mode type

and an SL logical channel identifier;
a mapping relationship between a mode type and an SL logical channel group identifier;
a mapping relationship between a mode type and an SL radio bearer identifier; and
a mapping relationship between a mode type and a destination identifier, wherein
the mode type comprises the Mode 1 and/or the Mode 2.

3. The method according to claim 2, wherein

the Mode 1 and the Mode 2 share a media access control MAC entity; or
the Mode 1 and the Mode 2 correspond to different MAC entities.

4. The method according to claim 3, wherein the Mode 1 and the Mode 2 share the MAC entity, and the performing configuration based on first configuration information comprises:
defining that the MAC entity performs at least one of following behaviors:

if there is no buffer data in currently configured SL logical channels, triggering a sidelink buffer status report SL BSR in a case that an SL logical channel on which data arrives corresponds to the Mode 1;
if there is buffer data in at least one of currently configured SL logical channels, triggering an SL BSR in a case that an SL logical channel on which data arrives has a higher logical channel priority and the SL logical channel on which data arrives corresponds to the Mode 1; and
if a retransmission SL BSR timer expires, triggering an SL BSR in a case that there is buffer data in at least one of currently configured SL logical channels, and an SL logical channel corresponding to the retransmission SL BSR timer corresponds to the Mode 1.

5. The method according to claim 3, wherein the Mode 1 and the Mode 2 share a MAC entity, and the performing configuration based on first configuration information comprises:
defining that the MAC entity performs the following behavior:

ignoring buffer data in a target SL logical channel when a buffer size indicated by a BS field of an SL BSR is being calculated, wherein
the target SL logical channel comprises at least one of an SL logical channel corresponding to the Mode 2 and an SL logical channel corresponding to a destination identifier corresponding to the Mode 2.

6. The method according to claim 4 or 5, further comprising:
performing configuration based on second configuration information, so that the terminal device works in the Mode 1 or the Mode 2.

7. The method according to claim 6, wherein the performing configuration based on second configuration information comprises:
defining that the MAC entity performs at least one of following behaviors:

cancelling a triggered SL BSR;
cancelling a triggered scheduling request SR, wherein the SR is triggered through an SL BSR;
stopping or restarting a retransmission SL BSR timer; and
stopping or restarting a periodic SL BSR timer.

8. The method according to claim 3, wherein the Mode 1 and the Mode 2 correspond to different MAC entities, and the method further comprises: obtaining, based on the first configuration information,

maximum transmit power P_max of the terminal device,
maximum transmit power P_max1 of a MAC entity corresponding to the Mode 1, and
maximum transmit power P_max2 of a MAC entity corresponding to the Mode 2.

9. The method according to claim 8, wherein the performing configuration based on first configuration information comprises: if the P_max is greater than a sum of the P_max1 and the P_max2, defining that the MAC entity corresponding to the Mode 1 and the MAC entity corresponding to the Mode 2 perform the following behavior:

allocating remaining power to the MAC entity corresponding to the Mode 1, or allocating remaining power to the MAC entity corresponding to the Mode 2; or
allocating remaining power to the MAC entity corresponding to the Mode 1 and the MAC entity corresponding to the Mode 2 based on a first preset proportion; or
allocating remaining power to the MAC entity corresponding to the Mode 1 or the MAC entity corresponding to the Mode 2 based on a size relationship between a priority of to-be-transmitted data and a first preset threshold; or
allocating remaining power to the MAC entity corresponding to the Mode 1 or the MAC entity corresponding to the Mode 2 based on a size relationship between a priority of to-be-transmitted data corresponding to the Mode 1 and a priority of to-be-transmitted data corresponding to

the Mode 2.

10. The method according to claim 8, wherein the performing configuration based on first configuration information comprises: if the P_max is less than a sum of the P_max1 and the P_max2, defining that the MAC entity corresponding to the Mode 1 and the MAC entity corresponding to the Mode 2 perform following behavior:

reducing the P_max1 or the P_max2 based on a difference between the P_max and the P_max1 and a difference between the P_max and the P_max2;
reducing the P_max1 and the P_max2 based on a second preset proportion;
reducing the P_max1 or the P_max2 based on a size relationship between a priority of to-be-transmitted data and a second preset threshold; or
reducing the P_max1 or the P_max2 based on a size relationship between a priority of to-be-transmitted data corresponding to the Mode 1 and a priority of to-be-transmitted data corresponding to the Mode 2.

11. The method according to any one of claims 1 to 10, wherein the performing configuration based on first configuration information comprises:
if a first resource corresponding to the Mode 1 conflicts with a second resource corresponding to the Mode 2, selecting a resource according to at least one of following rules:

preferentially using the first resource or preferentially using the second resource;
determining, based on a size relationship between a priority of to-be-transmitted data and a third preset threshold, to use the first resource or the second resource; and
determining, based on a size relationship between a priority of to-be-transmitted data corresponding to the Mode 1 and a priority of to-be-transmitted data corresponding to the Mode 2, to use the first resource or the second resource.

12. The method according to any one of claims 1 to 10, wherein the performing configuration based on first configuration information comprises:
defining that the terminal device performs at least one of:

sending sidelink control information SCI, wherein the SCI is used to indicate that SL scheduling is based on the Mode 1 or the Mode 2; and
sending sidelink feedback control information SFCI, wherein the SFCI is used to indicate that SL hybrid automatic repeat request HARQ is based on the Mode 1 or the Mode 2.

13. The method according to any one of claims 1 to 10, wherein the first configuration information is obtained in at least one of following manners:

being preconfigured;
being sent through a network device broadcast message; and
being sent through dedicated radio resource control RRC signaling of network device.

14. A sidelink SL transmission method, performed by a network device and comprising:
sending first configuration information, wherein the first configuration information is used to instruct a terminal device to configure a resource allocation mode, and the resource allocation mode comprises a network device scheduling mode Mode 1 and a terminal device autonomous mode Mode 2.

15. A terminal device, comprising:
a configuration module, configured to perform configuration based on first configuration information, so that the terminal device simultaneously works in both a network device scheduling mode Mode 1 and a terminal device autonomous mode Mode 2.

16. A network device, comprising:
a sending module, configured to send first configuration information, wherein the first configuration information is used to instruct a terminal device to configure a resource allocation mode, and the resource allocation mode comprises a network device scheduling mode Mode 1 and a terminal device autonomous mode Mode 2.

17. A terminal device, comprising a memory, a processor, and a program that is stored in the memory and executable on the processor, wherein when the processor executes the program, the steps of the method according to any one of claims 1 to 13 are implemented.

18. A network device, comprising a memory, a processor, and a program that is stored in the memory and executable on the processor, wherein when the processor executes the program, the steps of the method according to claim 14 are implemented.

19. A computer-readable storage medium, wherein the computer-readable storage medium stores a computer program, and when a processor executes the computer program, the steps of the method according to any one of claims 1 to 14 are implemented.

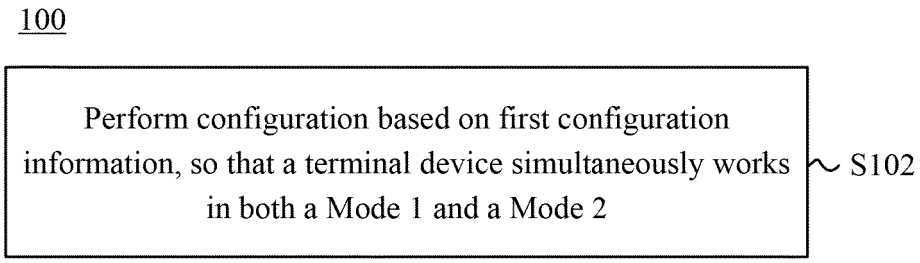

FIG. 1

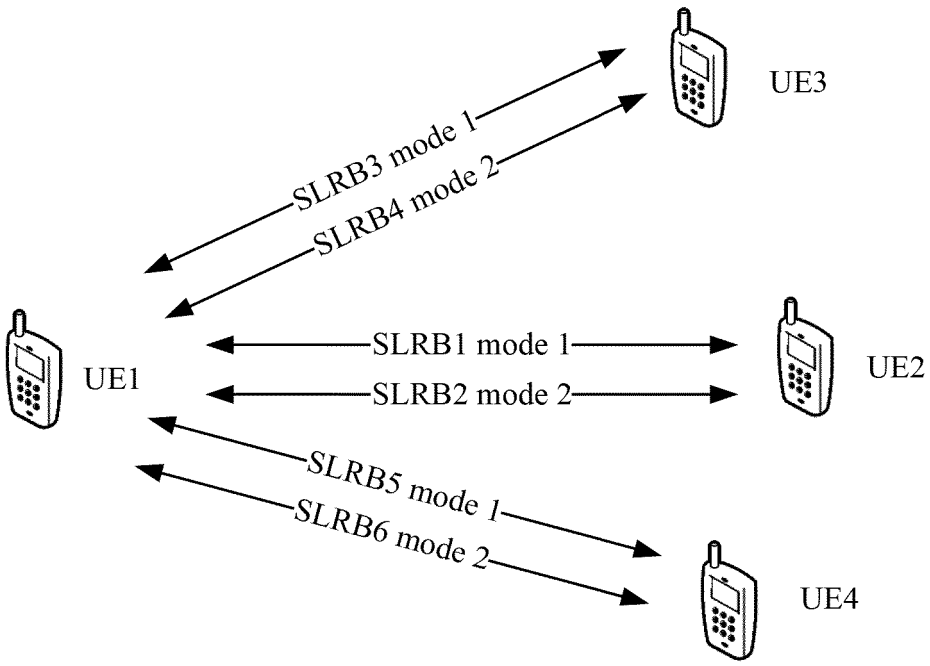

FIG. 2

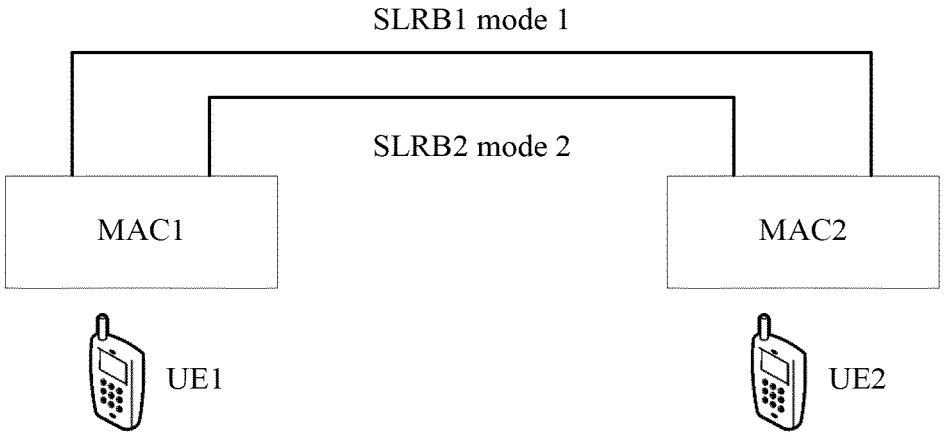

FIG. 3

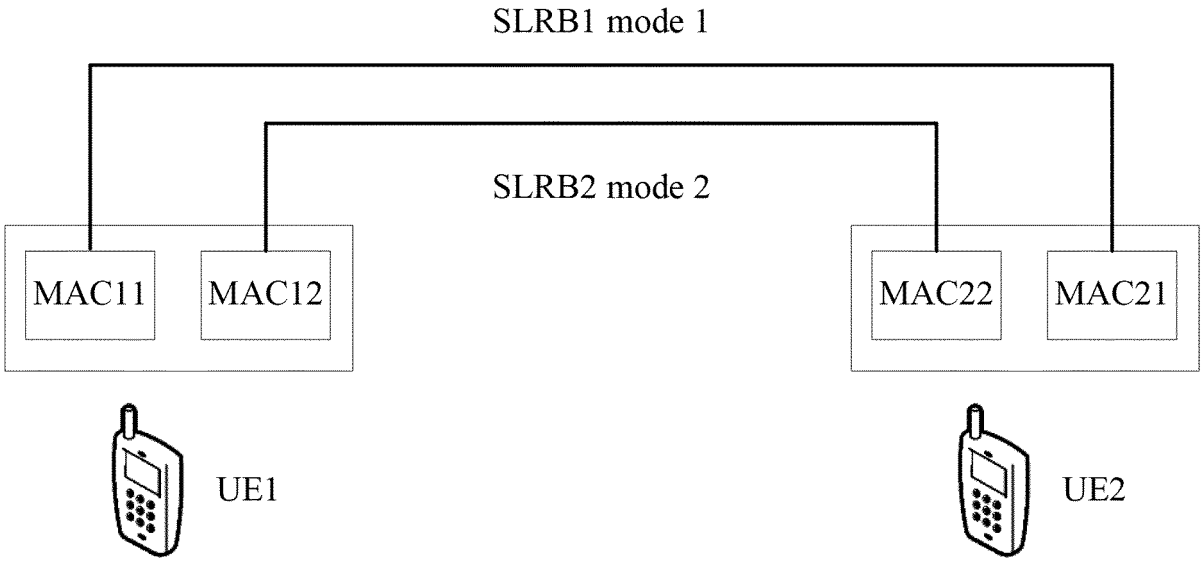

FIG. 4

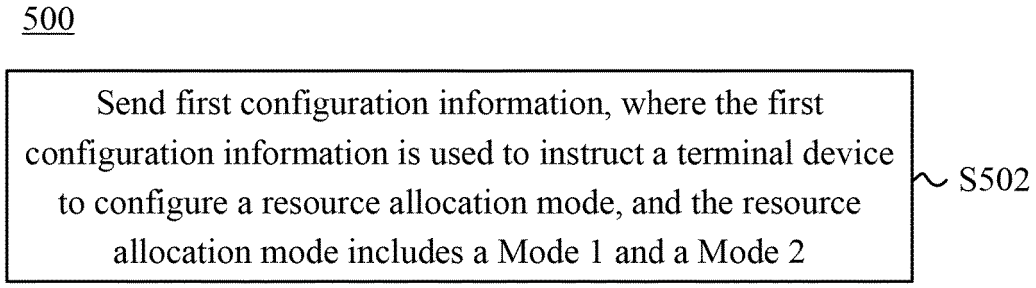

FIG. 5

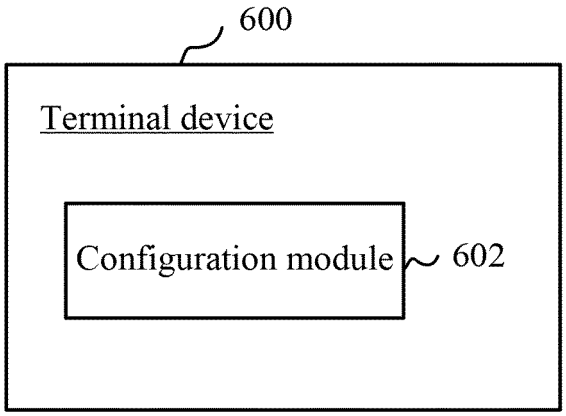

FIG. 6

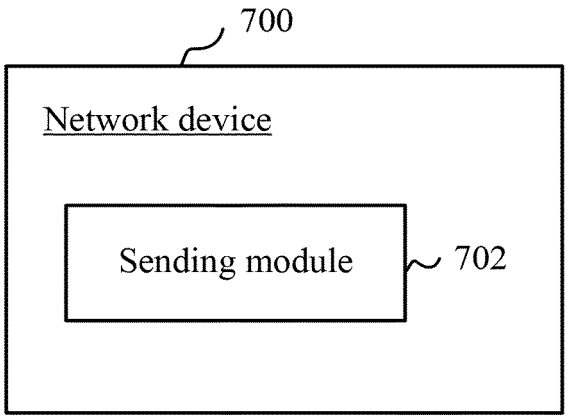
700
Network device
Sending module
702

FIG. 7

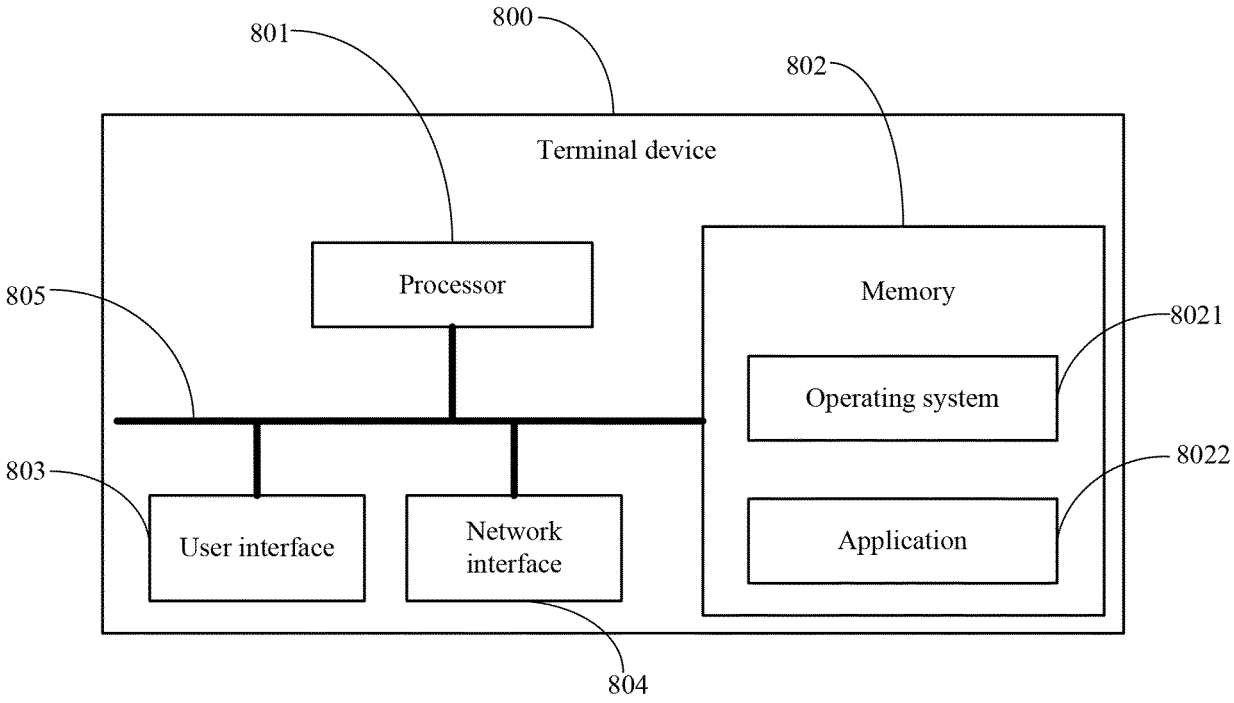
801
800
802
Terminal device
Processor
Memory
805
8021
Operating system
803
8022
User interface
Network interface
Application
804

FIG. 8

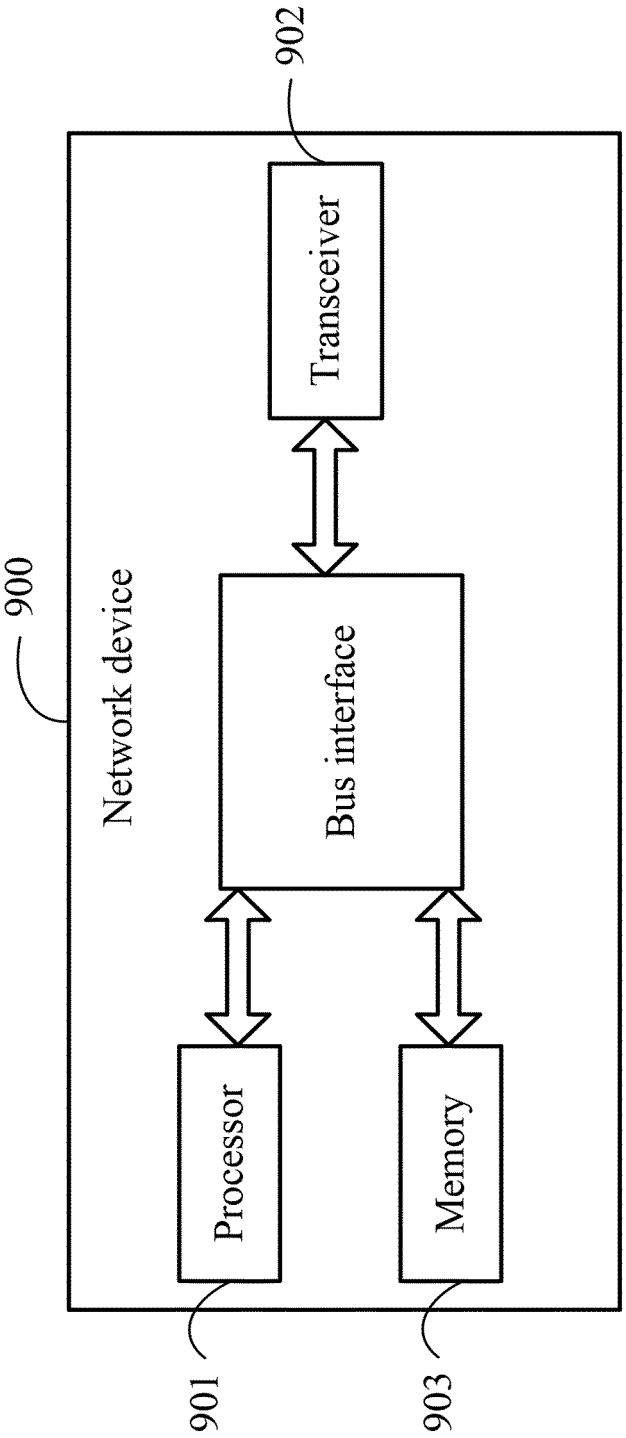
900
Network device
902
Transceiver
Bus interface
Processor
Memory
901
903

FIG. 9

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2020/073189

A. CLASSIFICATION OF SUBJECT MATTER

H04W 72/04(2009.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

H04W; H04L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CNPAT; CNKI; WPI; EPODOC; IEEE; 3GPP: V2X, D2D, MTC, 侧链路, 侧行链路, 侧行通信, 直接通信, 直通链路, 边链路, 模式, 类型, 调度, 自主, 双, 两, 二, 同时, 节约, 资源, 单一, 混合, 功率, 优先级, 配置, 设置, sidelink, side d link, mode, bi-mode, mixed mode, type, schedul+, both, two, one-mode, SL, BSR, power, priority, configuration, set, MAC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	OPPO. "Discussion on mode 2 resource allocation in NR-V2X" *3GPP TSG-RAN WG1 Meeting #95, R1-1812827,* 16 November 2018 (2018-11-16), sections 2 and 3	1-19
X	FUJITSU. "Discussion on Sidelink Bi-mode Transmission in NR-V2X" *3GPP TSG-RAN WG1 Meeting#94Bis, R1-1810595,* 12 October 2018 (2018-10-12), sections 2-4	1-19
A	CN 106304351 A (ZTE CORPORATION) 04 January 2017 (2017-01-04) entire document	1-19
A	CN 107852777 A (NTT DOCOMO INC.) 27 March 2018 (2018-03-27) entire document	1-19
A	CN 108668373 A (ZTE CORPORATION) 16 October 2018 (2018-10-16) entire document	1-19
A	WO 2017190662 A1 (CHINA ACADEMY OF TELECOMMUNICATIONS TECHNOLOGY) 09 November 2017 (2017-11-09) entire document	1-19

☐ Further documents are listed in the continuation of Box C. ☑ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
03 April 2020	**17 April 2020**
Name and mailing address of the ISA/CN **China National Intellectual Property Administration (ISA/CN)** **No. 6, Xitucheng Road, Jimenqiao Haidian District, Beijing 100088** **China** Facsimile No. **(86-10)62019451**	Authorized officer Telephone No.

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
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